Hands On Learning
with Reading Museum Service

BRAZIL NUTS (*Bertholletia excelsa*) G56

The Brazil nut (*Bertholletia excelsa*) is an amazing tree that can teach us important lessons about the inter-relationships of different plant and animal species, as well as about the impact that human beings can have on an ecosystem.



The Brazil nut is native to the Guianas, Venezuela, Brazil, eastern Colombia, eastern Peru and eastern Bolivia. It occurs as scattered trees in large forests on the banks of the Amazon, Rio Negro, and the Orinoco. The intersection of Amazonian Peru, Bolivia and Brazil is one of the world's most biologically diverse ecosystems. For example, the region supports the greatest known species densities of birds, butterflies and a number of other species groups. A single square kilometre supports twice as many butterfly species as the USA and more than 10 % of the entire world total.

The Brazil nut is among the largest trees in the Amazonian rainforest. It reaches 30-45 metres (100-150 ft) tall and 12m (36ft) trunk diameter. It may live for 500 years or more. The stem is straight and commonly unbranched for well over half the tree's height, with a large crown of long branches above the surrounding canopy of other trees. The bark is greyish and smooth.



Brazil nuts will only fruit in forests which have not been touched by human activity. This is because they must grow near to species of orchids that attract long-tongued orchid bees (left) and these orchids will only flourish in undisturbed forests. The orchids produce a scent that attracts orchid bees and the Brazil nut's yellow flowers can only be pollinated by these bees. Only they are strong enough to lift the coiled hood on the Brazil nut's flower (right) and have tongues which are long enough to negotiate its complex coiled interior.





Since it is illegal to cut down a Brazil nut tree in Peru, it is common to see them scattered around land that has been cleared for cows (left). These trees are a stark reminder of the once majestic rainforest. Unfortunately they will slowly die and are unable to regenerate as the absence of orchids means they will not produce fruit.

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If both the orchids and the bees are present, the fruit takes 14 months to mature after pollination of the flowers. The nuts (or, strictly speaking, the seeds) are housed in grapefruit-sized pods that contain about 20 seeds each. They are packed inside like the segments of an orange. These pods can weigh up to 2kg and they are said to fall with such force that they would kill you should one land on your head! The three samples in this box are all pods, one of which has been carved to expose the seeds inside.

Once they land on the ground the Brazil nut tree is dependent on another animal to distribute the seeds - the agouti (below left). This is thought to be one of the few animals which are capable of opening the mature Brazil nut pods. Each pod has a small hole at one end which the agouti is able to gnaw open. They then eat some of the nuts inside while burying others for later use. Some of these will germinate, but the young saplings may have to wait years, in a state of dormancy, for a nearby tree to fall and sunlight to reach it. If this happens they will grow rapidly and establish themselves as a fruiting tree (above right).



Brazil nuts, then, are dependent on orchid bees and provide food for the agouti. But this is not the only animal that benefits from them. The fallen flowers, for example, provide food for many forest inhabitants, such as leafcutter ants (right) and even animals like deer. The leafcutter ants carry them to their underground gardens where they use them to grow fungus for food. While the pods are immature, macaws (left) can get at the fruits with their sharp, powerful bill.





Even the empty pods find a use. Filled with rainwater they become the home for many organisms, including mayfly and mosquito larva. Zoologists have also discovered a species of toad (right) which lays its spawn inside the rain filled pods!



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The other animal that benefits from the Brazil nut is humankind. Brazil nuts are 14% protein, 11% carbohydrates, and 67% fat. Fortunately, they can not be grown in commercial plantations, for the reasons discussed on page one. This means that although they provide a food source for people, in order to benefit from them the surrounding forest has to be left undisturbed. All the Brazil nuts that are eaten in England at Christmas are collected in the wild, rather than from farms. Collecting Brazil nuts can give forest dwelling people both a steady income as well as an argument to use against those who want to fell the trees for other kinds of farming.



Most nuts are collected in Bolivia. In nearby Brazil the people who collect the nuts from the forest floor are called castañeros. They often work in family groups. The pods which have been collected are split open with a machete. After being extracted from the pods, the nuts are carried out of the forest in large sacks that may weigh over 45kg (100lb). Many families dry the nuts in the sun. This prevents rot and makes them easier to peel. The sacks of nuts are then often transported to the town in long dugout canoes, or sometimes on a balsa raft like the one on the left.





Although many of the nuts are exported in their shells, they fetch a higher price when they are peeled. This is done with nut-cracking machines (right) and provides a source of income for women in the area. Unshelled nuts are also in demand by companies that use the oil in products such as soap, shampoo, and body lotions.

Unfortunately, even this traditional form of collection can have a negative impact on Brazil nut trees if it becomes too intensive. Research has shown that areas with light gathering activities had many young trees, while sites with moderate and intense gathering practices had hardly any young trees. In these places so many seeds had been taken that not enough were left to replace older trees when they died. The production of Brazil nuts more than halved between 1970 and 1980, probably because of deforestation. In 1998 the World Conservation Union placed the Brazil nut tree on its red list of endangered species.